Fourth, and consequently, while the "need" to relocate from 18 to 24 GHz may be rationalized by military necessity, we believe that a thorough analysis carried out in a public rulemaking proceeding is the only way to properly address the alleged need to increase bandwidth or spectrum assigned. If the Commission does open up its Order for reconsideration, then we believe it is highly likely that the amount of additional spectrum that the Commission allocated to the DEMS in the 24 GHz band will ultimately be judged to be substantially larger than can be justified on public policy grounds.

V. Qualifications of Hatfield Associates, Inc.

Hatfield Associates, Inc. ("HAI") is an interdisciplinary consulting and research firm serving a wide variety of private and governmental clients in the telecommunications field. The firm was founded in February, 1982. In the fifteen years of its existence, the firm has provided consulting and educational services in nearly all aspects of the present and future telecommunications and telecommunications infrastructure, including local exchange networks, cable television systems, competitive access/competitive local exchange carrier networks, wireless land mobile and personal communications services, long haul terrestrial and satellite communications, data communications, and customer premises equipment.

Principals of the firm include consultants with graduate degrees and decades of senior level experience in engineering, economics, business and policy/regulation. Gene G. Ax, one of the authors of this study, has had over 35 years of experience in communications engineering with special emphasis on spectrum related matters. Dale N. Hatfield, the other author, has also had over 35 years of experience in the telecommunications field. He once served as Chief of the Office of Plans and Policy at the Federal Communications Commission and Acting Assistant Secretary of Commerce for Communications and Information. In addition to consulting and writing on spectrum management issues, he has also testified on the topic before Congress on numerous occasions.

Appendix

The Commission calculates the added or excess propagation and rain attenuation losses associated with moving from 18 GHz to 24 GHz as 11.8 dB. Of the 11.8 dB, 2.3 dB is attributed to the added free space loss and 9.5 dB is attributed to rain attenuation. In this situation, rain attenuation, in dB/km, is approximately proportional to the frequency raised to the 1.7 power. Therefore 24/18 raised to the 1.7 power equals 1.63. That is, rain attenuation at 24 GHz, in dB/km, is equal to rain attenuation at 18 GHz, in dB/km, times 1.63. For a path length of 5 km, we have the following attenuation, A, relationships:

A24 - A18 = 9.5 dB, and A24 = A18 x 1.63, so that 0.63A18 = 9.5 dB, and
A18 = 15.1 dB or 3.02 dB/km. Also, A24 = 1.63A18 = 24.6 dB, or 4.92 dB/km.

With R representing distance in kilometers, we can set $4.92R + 20\log R = 15.1 + 20\log 5$ to find the value of R less than 5 km that has the same propagation and rain attenuation at 24 GHz as R equal to 5 km at 18 GHz. From this, one obtains R = 3.63 km. Thus, it is easy to see that any significant error in estimating the coverage radius of a typical cell has a very large impact on the amount of additional spectrum required to compensate for additional radio wave attenuation in the 24 GHz band.

CERTIFICATE OF SERVICE

I, Katherine M. Collins, hereby certify that on this 23rd day of July, 1997, true and correct copies of the foregoing Reply to Joint Opposition to Petitions for Reconsideration, Partial Reconsideration, and Clarification filed by Digital Services Corporation, Microwave Services, Inc., and Teligent, L.L.C. were served by hand delivery or by overnight mail (*) on the following parties:

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